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CLAIMS

What is claimed is:

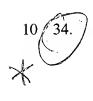
- 1. A compound comprising hematin derivatized with one or more nonproteinaceous amphipathic groups.
- 5 2. The compound of Claim 1, wherein said compound is soluble in solutions ranging from pH 1 to pH 12.
 - 3. The compound of Claim 1, wherein the amphipathic group is a substituted or unsubstituted polyalkylene glycol.
- 4. The compound of Claim 3, wherein the polyalkylene glycol is substituted or unsubstituted polyethylene glycol.
 - 5. The compound of Claim 4, wherein polyethylene glycol groups have a molecular weight of about 400 to about 100,000.
- 6. A method of polymerizing an aromatic monomer, comprising combining an aromatic monomer with a hematin catalyst, wherein the hematin catalyst has been derivatized with one or more non-proteinaceous amphipathic groups.
 - 7. The method of Claim 6, further comprising combining a peroxide initiator with the aromatic monomer and the derivatized hematin.
- 8. The method of Claim 7, further comprising a template, wherein the aromatic monomer aligns along said template and polymerizes to form a complex comprising the polymerized aromatic monomer and the template.

- 9. The method of Claim 8, wherein the template is a polyelectrolyte.
- 10. The method of Claim 9, wherein the polyelectrolyte is polyanionic.
- 11. The method of Claim 10, wherein the polyanionic polyelectrolyte is poly(styrene sulfonic acid) or a salt thereof.
- 5 12. The method of Claim 8, wherein the template is optically active.
 - 13. The method of Claim 12, wherein the optically active template is an oligonucleotide or a polynucleic acid or a salt thereof.
 - 14. The method of Claim 13, wherein the polynucleic acid is 2'-deoxyribonucleic acid or a salt thereof.
- 10 15. The method of Claim 10, wherein the template is lignin sulfonic acid or a salt thereof.
 - 16. The method of Claim 10, wherein the template is dodecylbenzene sulfonic acid or a salt thereof.
- 17. The method of Claim 8, wherein the aromatic monomer is a substituted or unsubstituted aromatic compound.
 - 18. The method of Claim 17, wherein the aromatic compound is an aniline.
 - 19. The method of Claim 18, wherein the aniline is 2-methoxy-5-methylaniline.

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- 20. The method of Claim 17, wherein the aromatic compound is a phenol.
- 21. The method of Claim 18, wherein the complex formed is a water-soluble complex of a polyaniline and the template.
- 22. The method of Claim 21, wherein the polyaniline is of the electrically-conducting emeraldine salt form.
- 23. The method of Claim 20, wherein the complex formed is a water-soluble complex of polyphenol and the template.
- 24. The method of Claim 12, wherein the polymerized aromatic monomer complexed to the template has a macro-asymmetry.
- 10 25. A method of preparing a derivatized hematin, comprising reacting hematin with one or more amphipathic compounds, thereby forming a derivatized hematin.
 - 26. The method of Claim 25, wherein the hematin is reacted with one or more amphipathic compounds in the presence of a carboxylic acid activating compound and an aprotic base.
- 15 27. The method of Claim 26, wherein the carboxylic acid activating compound is a dialkylcarbodiimide.
 - 28. The method of Claim 25, wherein the amphipathic compound is a substituted or unsubstituted polyalkylene glycol.
 - 29. The method of Claim 28, wherein the polyalkylene glycol is polyethylene glycol.

- 30. An assembled hematin comprising hematin deposited on an electrically charged substrate in one or more layers alternating with one or more layers of a polyelectrolyte.
- 31. The assembled hematin of Claim 30, wherein the polyelectrolyte is a cationic polymer.
 - 32. The assembled hematin of Claim 31, wherein the cationic polymer is a poly(dialkyldiallylammonium salt) or a poly(trialkylallylammonium salt).
 - 33. The assembled hematin of Claim 32, wherein the poly(dialkyldiallylammonium salt) is poly(dimethyldiallylammonium chloride).



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A method of polymerizing an aromatic monomer, comprising contacting an aromatic monomer and a template with assembled hematin, wherein assembled hematin comprises hematin deposited on an electrically charged substrate in one or more layers alternating with one or more layers of a polyelectrolyte, thereby polymerizing the aromatic monomer to form a complex of polymerized aromatic monomer and said template.

- 35. The method of Claim 34, wherein the template is an anionic polymer.
- 36. The method of Claim 35, wherein the anionic polymer is polystyrene sulfonic acid or a salt thereof.
- The method of Claim 34, wherein the aromatic monomer is a substituted or unsubstituted aromatic compound.
 - 38. The method of Claim 37, wherein the aromatic compound is an aniline or a

phenol.

- 39. The method of Claim 34, wherein the complex of a polymerized aromatic monomer and a template forms in solution.
- The method of Claim 34, wherein the complex of a polymerized aromatic
 monomer and a template forms on the assembled hematin.
 - 41. A method of forming assembled hematin, comprisingly alternately depositing one or more layers of hematin and one or more layers of a polyelectrolyte on an electrically charged substrate.
 - 42. The method of Claim 41, wherein the polyelectrolyte is a cationic polymer.
- 10 43. The method of Claim 42, wherein the cationic polymer is a poly(dialkyldiallylammonium salt) or a poly(trialkylallylammonium salt).
 - 44. The method of Claim 43, wherein the poly(dialkylallylammonium salt) is a poly(dimethyldiallylammonium chloride).